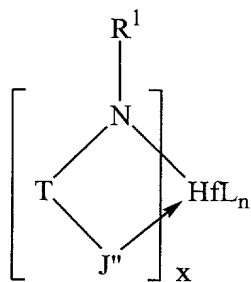


What is claimed is:

1. A metal-ligand complex characterized by the following formula:



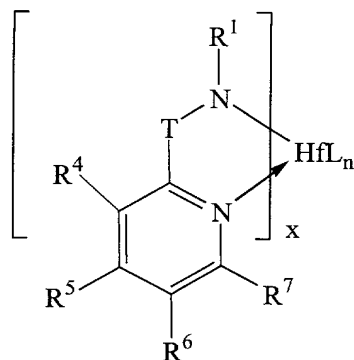
wherein R^1 is selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl and combinations thereof;

T is a bridging group selected group consisting of $-CR^2R^3-$ and $-SiR^2R^3-$ with R^2 and R^3 independently selected from the group from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof;

J'' is selected from the group consisting of heteroaryl and substituted heteroaryl;

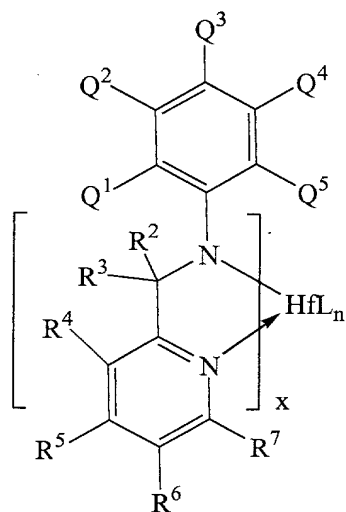
each L is independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, phosphine, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, ethers, thioethers and combinations thereof or optionally two or more L groups are joined into a ring structure; n is 1, 2, 3, 4, 5, or 6; and x is 1 or 2.

2. The metal complex of claim 1 having the formula:



wherein each of R⁴, R⁵, R⁶ and R⁷ is independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof; and optionally, any combination of R¹, R², R³, R⁴, R⁵, R⁶ or R⁷ may be joined together in a ring structure.

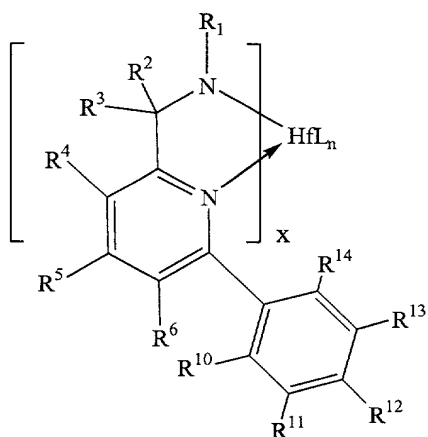
3. The metal complex of claim 2, wherein said complex is characterized by the formula:



wherein Q¹, Q², Q³, Q⁴ and Q⁵ are independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino,

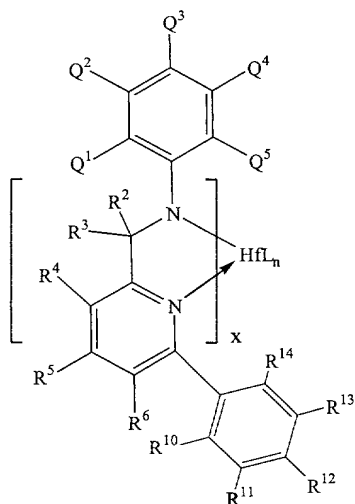
amino, thio, seleno, nitro, and combinations thereof; optionally any 2 of Q¹, Q², Q³ Q⁴ and Q⁵ are joined together in a ring structure; and x = 1.

4. The metal complex of claim 2, wherein said complex is characterized by the formula:



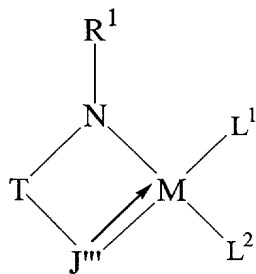
such that T is $-CR^2R^3-$ and wherein R¹⁰, R¹¹, R¹² and R¹³ are each independently selected from the group consisting of hydrogen, halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, nitro, and combinations thereof; optionally, two or more R¹⁰, R¹¹, R¹² and R¹³ groups may be joined to form a fused ring system having from 3-50 non-hydrogen atoms; and R¹⁴ is selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof; and x = 1.

5. The metal complex of claim 4, wherein said complex is characterized by the general formula:



herein Q^1 , Q^2 , Q^3 , Q^4 and Q^5 are independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, nitro, and combinations thereof; optionally any 2 of Q^1 , Q^2 , Q^3 , Q^4 and Q^5 are joined together in a ring structure.

6. A metal complex characterized by the formula:



where M is zirconium or hafnium;

wherein R^1 is selected from the group consisting of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl and combinations thereof;

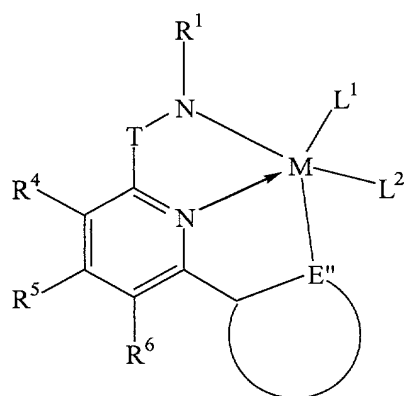
T is a bridging group selected group consisting of $-CR^2R^3-$ and $-SiR^2R^3-$ with R^2 and R^3 being independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl,

heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof;

J^{'''} being selected from the group of substituted heteroaryls with 2 atoms bonded to the metal M, at least one of those 2 atoms being a heteroatom, and with one atom of J^{'''} is bonded to M via a dative bond, the other through a covalent bond; and

L¹ and L² are independently selected from the group consisting of halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, hydroxy, boryl, silyl, amino, amine, hydrido, allyl, diene, seleno, phosphino, phosphine, carboxylates, thio, 1,3-dionates, oxalates, carbonates, nitrates, sulphates, ethers, thioethers and combinations thereof or optionally the two L groups are joined into a ring structure.

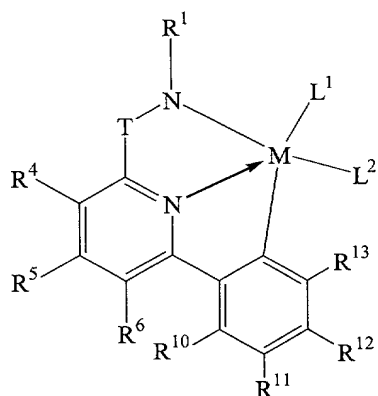
7. The complex of claim 6, wherein said complex is characterized by the formula:



wherein each of R⁴, R⁵ and R⁶ is independently selected from the group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, halide, nitro, and combinations thereof; and optionally, any combination of R¹, R², R³, R⁴, R⁵, or R⁶ may be joined together in a ring structure; and

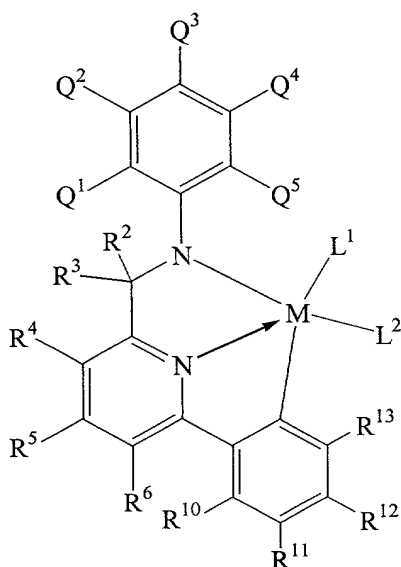
E'' is either carbon or nitrogen and is part of a cyclic aryl, substituted aryl, heteroaryl, or substituted heteroaryl group.

8. The metal complex of claim 7, wherein said complex is characterized
by the formula:



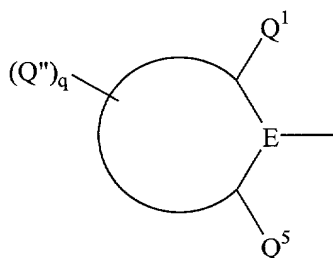
wherein R^{10} , R^{11} , R^{12} and R^{13} are each independently selected from the group consisting of hydrogen, halide, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, nitro, and combinations thereof; optionally, two or more R^{10} , R^{11} , R^{12} and R^{13} groups may be joined to form a fused ring system having from 3-50 non-hydrogen atoms.

9. The metal complex of claim 8, wherein said complex is characterized
by the formula:



4 wherein Q^1 , Q^2 , Q^3 , Q^4 and Q^5 are independently selected from the group consisting of
5 hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl,
6 substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted
7 aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino,
8 amino, thio, seleno, nitro, and combinations thereof; or optionally, two of Q^2 , Q^3 and
9 Q^4 are joined together in a ring structure.

1 10. The complex of either of claims 1, 2, 4, 6, 7 or 8, wherein R^1 is characterized by
2 the general formula:

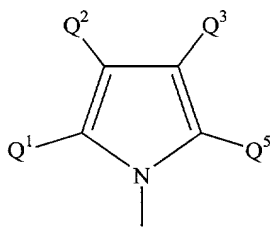


3
4 wherein E is either carbon or nitrogen,

5 Q^1 and Q^5 are substituents on the R^1 ring at a position ortho to E , with at least one
6 of Q^1 or Q^5 being bulky Q^1 and Q^5 are independently selected from the group consisting
7 of alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, aryl, substituted aryl and
8 silyl, but provided that Q^1 and Q^5 are not both methyl; and

9 Q''_q represents additional possible substituents on the ring, with q being 1, 2, 3, 4
10 or 5 and Q'' being selected from the group consisting of hydrogen, alkyl, substituted
11 alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl,
12 heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl,
13 substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno,
14 halide, nitro, and combinations thereof.

1 11. The complex of claim 10, wherein R^1 is characterized by the general



2 formula

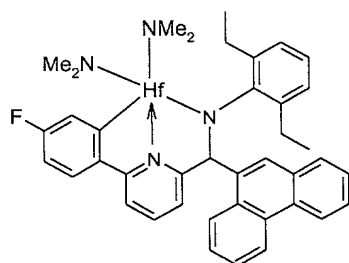
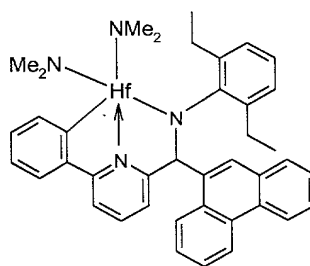
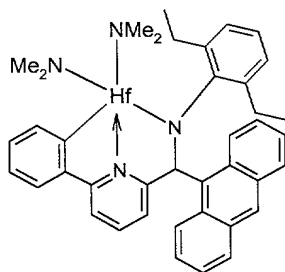
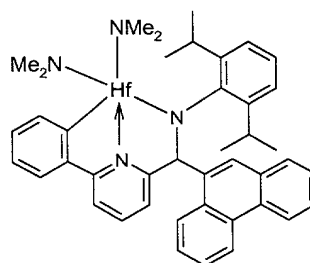
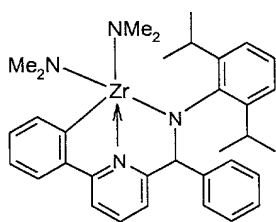
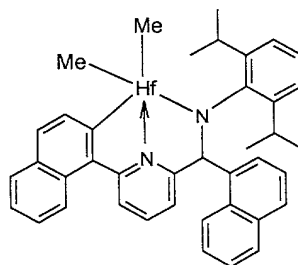
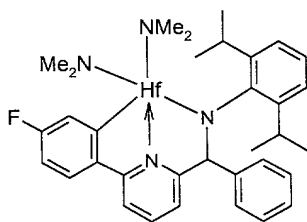
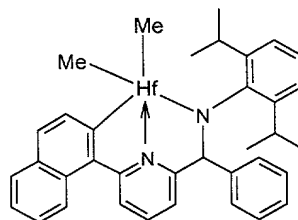
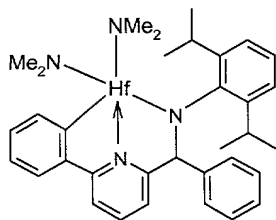
wherein Q^2 and Q^3 are independently selected from the

group consisting of hydrogen, alkyl, substituted alkyl, cycloalkyl, substituted cycloalkyl, heteroalkyl, substituted heteroalkyl, heterocycloalkyl, substituted heterocycloalkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, alkoxy, aryloxy, silyl, boryl, phosphino, amino, thio, seleno, nitro, and combinations thereof; or optionally, Q^2 and Q^3 are joined together in a ring structure.

12. The complex of either of claims 6, 7, 8 or 9, wherein M is hafnium.

13. The complex of either of claims 6, 7, 8 or 9, wherein L^1 and L^2 are the same and selected from the group consisting of methyl and dimethylamino.

14. The complex of claim 13, wherein said complex is selected from the group consisting of:



3

- 1 15. A catalyst comprising the complex of either of claims 1, 2, 3, 4, 5, 6, 7, 8
2 or 9, combined with an activator, combination of activators or activating technique.

1 16. The catalyst of claim 15, wherein said catalyst comprises activator that is
2 an ionic activator.

1 17. The catalyst of claim 16, additionally comprising at least one of a group
2 13 reagent, a divalent metal reagent or an alkali metal reagent.